

purpose has been for some time exempt from duty on certain conditions. An excellent preparation, the *nicotine* dip, is thus manufactured.

We have had in view in the foregoing remarks the utility of this work to practical men who may seek in its pages facts and principles which would be of direct use and benefit to them in their pursuit of agricultural wealth. Possibly the author intends that it should become a textbook for the use of the 760 persons who, according to the last census, are learning farming professionally in England and Wales. Many of these will, it is to be hoped, in due time, become the agricultural luminaries of their country. It is of national importance that their minds should be thoroughly filled with the great truths of scientific agriculture. They can pick up facts readily enough on the several farms on which they reside; but to books they must look mainly for an exposition of scientific principles. To review this book, or any kindred work, in a way which would be of value to the agricultural student, would require more space than is at our disposal. We shall therefore select one subject well adapted to our purpose, and notice the author's treatment of it. That subject is breeding, which to the agricultural student and to the nation at large possesses the deepest possible interest. The section, or essay, on this subject is introduced under a high-sounding title—"The Principles and Practice of Breeding." We expected a masterly exposition of principles and an array of facts to maintain them. We have been disappointed. Some principles enunciated, which are either wholly or partially true, are illustrated by unhappy examples; and statements are made which are either questionable or contradicted by other statements. In common with many authors and breeders, Mr. Spooner is of opinion that in the offspring the characteristics of the male prevail in the majority of cases (p. 145). The discussion of this subtle topic would occupy much space. We cannot enter upon it now. But if the statement were true in the way Mr. Spooner puts it, the majority of lambs would be of the male gender; but it is not always so. In support of the above proposition we are reminded that "the mule partakes more of the nature of its sire, the ass, than of its dam, the mare." This is quite true; but is it not also true that the jennett is more like its dam, the ass, than its sire, the horse? The statements copied from one work into another on the paramount influence of the male are based partly on erroneous views, and partly on inadequate facts. Given a male and female equal in breeding, in age, and vigour of constitution, they will contribute equally to the characters of the offspring. As a rule the male in every class of live stock is better bred than the female; and as a matter of course the offspring partakes more of his characteristics. Mr. Spooner does not appear to have appreciated the hereditary influence. "Some farmers," he says, "are real advocates for a pure breed and a long pedigree, whilst others despise the pedigree and prefer gaining their ends by means of crossing. Each to a certain extent is right, and each wrong." We ask, how can any person be right to any extent, who despises pedigree? Again, we are told, in the same page, that "a long pedigree may be useless." We give Mr. Spooner credit for more intelligence than to believe he entertains the opinion which those words convey. Indeed, we go so far as to ex-

press our belief that, owing to the peculiar style in which he writes, his words do not always convey his real views. We find additional evidence of this in his remarks on breeding in-and-in. Any person conversant with the first principles of breeding knows that breeding in-and-in intensifies the hereditary influence. Two rams, for example, equal in size, age, shape, vigour, and quality, but differing in this—that one is closely bred, while the other is not, will leave their marks on the offspring in very different degrees. The one which is closely bred will, as every breeder of experience and intelligence knows, perpetuate his own points with much greater certainty than the other. According to the language of Mr. Spooner, we should look chiefly to the "resemblance" of the parents. "The stronger resemblance," he says, "there is between the qualities of both parents, if they are good, the more likely is it that the offspring will be perfect." While it is quite true that the nearer the sire and dam approach to each other in shape and quality the better, we are not to recognise this as the embodiment of any fundamental principle of breeding. One of the most difficult things the breeder of improved stock has to effect is to produce uniformity of type or resemblance. The question is, How is it to be done? The answer is this: Skill must be exercised in pairing animals until the desired qualities are produced; and those qualities once obtained, are fixed by close breeding. It is thus that the qualities of shorthorn cattle and Leicester sheep were permanently established. And it is thus, and thus only, that any breeder of our time, or of future time, can succeed in establishing an improved variety of our domestic animals.

In this section of his book, as well as in other parts of it, Mr. Spooner gives a large number of useful and instructive facts on the subject of crossing. We feel very great pleasure in adding that his remarks on this important subject will be worth many times the cost of the work to thousands of sheep-farmers in Great Britain.

CLOWES'S PRACTICAL CHEMISTRY

An Elementary Treatise on Practical Chemistry and Qualitative Inorganic Analysis, specially adapted for use in the Laboratories of Schools and Colleges, and by Beginners. By Frank Clowes, B.Sc. Lond., Science Master at Queenwood College. (London : J. and A. Churchill, 1874.)

If the rate of progress of a science is to be measured by the number of text-books produced annually, Chemistry must assuredly advance with greater strides than any of its sister sciences. Whether this is actually the case we leave to our readers to judge, contenting ourselves here with pointing out the fact that while English Physics is represented by a few manuals, of which a considerable proportion are translations from foreign works, the market is, so to speak, glutted with an ever-increasing stock of chemical text-books.

The volume now before us is the production of a practised teacher of the science, and will doubtless be found of service outside the author's own classes. The work is divided into seven sections and an appendix. In the first section the student is introduced to experiments illustrating the methods of preparation and properties of

the common gases, such as oxygen, hydrogen, carbon dioxide, nitric oxide, ammonia, carbon monoxide, chlorine, and hydrochloric acid. After the preparation of these gases the student is made acquainted with the process of distillation as applied to water, and to the preparation of nitric acid. The entire absence of theory from this section is perhaps to be regretted. Although a student may have previously read the reactions that occur in the preparation of the various gases, there is no more favourable opportunity for impressing these upon the mind than at the time of performing the experiment for himself. If beginners were always to ask themselves, What *chemical* change is going to occur in this tube or flask? and then write down the equation, the knowledge gained would not be of that purely mechanical nature which the boring of corks and bending of glass tubes alone tend to engender.

Section II. treats of the preparation and use of the apparatus required for analysis. Bunsen's burner, the spirit lamp, blowpipe, bending and cutting of glass tubing, cork-boring, and other practical minutiae, are here described, and some valuable hints given on the use of the various pieces of apparatus employed by the student of analysis.

The details of glass-working seem to us somewhat misplaced here. Tubing must be bent, and corks bored and fitted into flasks, tubes, &c., in the course of fitting up the apparatus for the preparation of gases; so that it would be more logical if this section were made to precede Section I. We miss from this section, also, any reference to the excellent blowpipes made on Herapath's principle, now so generally employed in our laboratories. Students who have once used these blowpipes soon abandon the old mouth blowpipe figured in the present work.

The various operations connected with analysis are described and experimentally illustrated in Section III. Here the student is made acquainted with the processes of solution, crystallisation, filtration, evaporation, precipitation, ignition, &c., and the way is thus prepared for the next section, wherein are given the analytical reactions of the more commonly occurring metals. The author adopts the usual analytical classification; this section, indeed, offers but little scope for originality, and we find the same tests and reactions which are to be found in the works of Fresenius and Rose, and the many volumes of their imitators. The modicum of theory relating to the use of symbols and the expression of reactions as equations, which we should have preferred to see in an earlier portion of the book, finds place at the beginning of the present section. We are glad to see equations given for most of the reactions of the metals; too often the words "white pp." or "black pp." go down into the student's note-book without any idea of what chemical change has occurred having entered into his mind. After the reactions of the metals of each group, tables are given showing the characteristic differences between the members of that group and the methods to be pursued in the cases of mixtures. This plan of tabulating the differences between the various metals of a group is a special feature of the present work; in this country the idea seems to have been first introduced into Galloway's "Manual of Qualitative Analysis," and its adoption by Mr. Clowes is to be highly commended.

When a student is made to go through a long series of reactions with closely allied metals, he is apt to overlook the points in which they differ unless these are specially pointed out to him. It is as though a zoologist were to give lengthy descriptions of two closely allied species of a genus without any reference to their differential characters. The reactions of the acids, inorganic and organic, follow those of the metals.

Passing on to Section V., we find the ordinary course of analysis pursued in [the case of a simple salt containing one base and one acid, the tables being modified to meet the cases of solids and liquids, acid or alkaline.

In the following section, containing the complete course of analytical tables for complex mixtures, we recognise the well-known tables compiled, we believe, by Dr. Hofmann for the Royal College of Chemistry. The phosphate table devised by Mr. Valentin has been introduced with the author's permission. The present work offers, therefore, as good an analytical course as is to be found in any of our text-books, the type in which the tables are printed is decidedly small, but the plan of printing them *across* instead of *along* the page, offers, as the author justly claims, a distinct advantage.

Section VII. is devoted to a description of apparatus and reagents used in the analytical course. The methods given for constructing pieces of apparatus for general use, and the preparation of special reagents such as hydrofluosilicic acid, will be found valuable adjuncts to the book. The appendix contains a list of elements with their symbols and atomic weights, formulae for the conversion of thermometric scales, and tables of weights and measures.

It will perhaps be better not to inquire into the *raison d'être* of the work an outline of which we have now laid before our readers. It may be asked why the student should not be made acquainted with the method of preparation and properties of nitrogen, nitrous oxide, phosphoretted hydrogen, and cyanogen; these gases surely are of sufficient chemical importance to justify a knowledge of their properties, and their preparation cannot but furnish good exercise for the manipulatory skill of a student. The list of corrigenda is certainly alarming, and we hope the author will have the opportunity of correcting these in a later edition.

The defects we have had occasion to point out in the course of this notice are not, it must be admitted, of a very grave character. We do not scruple to say that the author has performed his task on the whole well, and we should have no hesitation in putting the book into the hands of the chemical student.

The present volume may, in fact, be taken as a fair average specimen of the systems of teaching practical chemistry followed in this country, and as such we shall venture a few remarks upon it in concluding. In the first place, we should like to see a little more *science* introduced into our courses of analysis—something of the nature of a chemical key to the analytical tables is in our opinion a desideratum. At present the student generally follows blindly the instructions given in the tables; he dissolves, precipitates, or filters without any regard to the chemical reactions occurring at the various stages. It is similar to the old system of learning off a problem of Euclid by heart, without entering into the reasoning—change the

order of the letters, and confusion is the result. Then, again, we venture to think that a little more of what we may call manufacturing chemistry might be with advantage introduced into our laboratories. After preparing the gases, the student goes on to study the analytical reactions of the metals, where there is very little scope for manipulation. Between these stages, or simultaneously with the latter, the preparation on a large scale of some of the reagents used in analysis, or of some compounds demanding skill and caution, such, for example, as the chlorides of phosphorus, would give a more extended knowledge of practical details, and at the same time furnish the student with a certain amount of technical instruction equally valuable to him as a scientific man or as a manufacturer.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*]

The Royal Agricultural Society and the Potato Disease

My attention has been drawn to a letter in NATURE, vol. xi. p. 67, signed "W. T. Thiselton Dyer," and headed "Royal Agricultural Society and the Potato Disease." It appears that Prof. Dyer has founded the statements and criticisms in that letter upon a paragraph which appeared in the preceding number of NATURE. Had he taken the trouble to read the official reports that have been published by the Society in the agricultural newspapers, the criticisms he might then have made would probably have had some value; and I must express my surprise that a man of scientific pursuits should have omitted to take that most necessary and most elementary course which I may term the verification of fundamental facts. This is the more remarkable as he criticises the Society's want of "methodical scientific method of investigation."

Prof. Dyer asks, "Is it not surprising that the Royal Agricultural Society should think the offer of a *tool* prize for an essay in any way an adequate method of dealing with the subject?" Now, what does Prof. Dyer mean by this question? He seems to imply that the Royal Agricultural Society offered such a prize, and that therefore they thought it an adequate method of dealing with the subject. But the Society did not offer such a prize, and have not considered whether such a method would or would not be adequate to deal with the subject.

The truth is, that Lord Cathcart offered such a prize two years ago, and asked the Council of the Society to nominate the judges and otherwise to take charge of the competition. This they did, and for this alone are they responsible.

Prof. Dyer proceeds: "The Society then determined to offer prizes for disease-proof potatoes." To this I must beg leave to reply that the Society did not offer prizes for "disease-proof potatoes," but for potatoes which should resist disease for three years in succession in twenty different districts of the United Kingdom. If the somewhat lengthy statement of the terms on which the prize was offered has been colloquially abbreviated into "disease-proof potatoes," that does not justify a scientific man in basing an argument upon it, especially in the columns of a scientific journal.

Prof. Dyer continues: "The utter futility of this proceeding was clearly obvious to anyone in the least acquainted with the subject." Here again I must join issue with the Professor. This prize was offered because certain essayists asserted, and seedsmen advertised, that they possessed varieties of potatoes which would resist disease. To put these statements to the test was in conformity with the Society's ordinary practice, which is to endeavour to make its members acquainted with the actual agricultural value of various articles, whether they be seed-potatoes, manures, implements, or other commodities. As the result has been to show that none of the potatoes experimented upon can resist disease for even one year in our twenty stations, the members of the Society now know what value to attach to the assertions of their proprietors, and the result is therefore not utterly futile.

These experiments have also been utilised to ascertain the influence of soil, climate, and modes of management on the crop

itself, and on the potato disease; and the results of this inquiry are now being worked out.

Prof. Dyer goes on to say: "Now, it seems to me that this spasmodic and ill-considered way of dealing with a serious subject contrasts, to an extent that it is impossible quite to regard with satisfaction, with the course that would be adopted in such a matter in other countries. It shows, at any rate, how little the methodical scientific method of investigation is understood by the majority of well-informed English people." I am content to ask Prof. Dyer to point out what is "spasmodic" and what is "ill-considered" in the action of the Society, and how does he justify his assertion about "the methodical scientific method of investigation?"

It must be remembered that the Royal Agricultural Society was not established for the advancement of science, and certainly not for the advancement of botany; but it was established for the promotion of agriculture, especially by the encouragement of the application of the discovered truths of science to the practice of agriculture, as is shown by its motto, "Practice with Science."

The Royal Agricultural Society does, however, enlist the services of scientific men upon its regular staff, and in this and other ways seeks to direct their attention to agricultural problems upon which the light of science is still wanting. As Prof. Dyer has contrasted the Society's "spasmodic and ill-considered way" with "the course that would be adopted in such a matter in other countries," I hope that he will inform me of the course that Agricultural Societies in other countries have adopted in reference to the potato disease and other such matters, without receiving assistance from the Government of the country.

I now come to what Prof. Dyer calls his "second point." He states that the Society, "anxious not to be entirely foiled, offered a sum of money to a well-known investigator of the life-history of fungi, Prof. de Bary, of Strasburg, to induce him to study the potato disease. Considering that De Bary had already written an admirable memoir on the *Peronospora*, there was a certain simplicity in supposing that the gift of a sum of money would elicit some additional information which his zeal as a scientific investigator had failed to do."

So far as I understand the meaning of the phrase "anxious not to be entirely foiled," it implies some previous disappointment. Now, so far is this from having been the fact, that the first step taken by the Council of the Society was to direct me to write to Prof. de Bary and urge him to continue his researches into the life-history of *Peronospora infestans*, in view of the vast importance of the subject in its agricultural bearings. Therefore I cannot see how the term "anxious not to be entirely foiled" can be made applicable to it.

The Society at the same time volunteered to place a sum of money at its disposal towards defraying the expenses which he might find it necessary to incur, but I hope that my communication to Prof. de Bary was not conceived in the offensive spirit which Prof. Dyer seems to suggest. The principle involved has been adopted by the British Association as one of the best means of advancing science, and I consider it a very different matter from that "certain simplicity" which Prof. Dyer derides.

This was not only the first, but it was the only step then taken by the Society in reference to the scientific questions bearing upon the potato disease; and its results up to this time are in no respect indicated by the grotesque statements which Prof. Dyer quotes.

H. M. JENKINS,
Secretary of the Royal Agricultural
Society of England

Nov. 29

Anabas scandens

In a short notice of the contents of the August number of the *Bulletin de la Société d'Acclimatation de Paris*, in NATURE, vol. xi. p. 98, reference is made to M. Cabonnier's announcement of "the arrival from India of several specimens of three varieties of fish never hitherto brought to Europe—the *Anabas scandens* or Climbing Perch," &c. With respect to the *Anabas scandens*, I wish to remark that in April 1872 I sent from Calcutta to the Gardens of the Royal Zoological Society of Ireland two specimens of this fish. Both specimens arrived safely and were exhibited in a tank in the Gardens; one died soon after arrival, the other lived for several months, succumbing at length to the cold of the following winter.*

Royal Victoria Hospital, Netley, Dec. 5

G. E. DOBSON

* Sec Forty-first Annual Report of the Royal Zool. Soc. of Ireland: also P. Z. S. Lond. 1874, p. 319.